REMARKS

Claims 1-18 and 22-23 are pending in the present application. Claims 19-21 and 24-27 were canceled. Reconsideration of the claims is respectfully requested.

Also, Applicants have submitted proposed corrections to drawings labeled Figure 3 in red ink to show the second set of connections described in Claim 1. These changes will be incorporated into a formal set of drawings upon approval of the proposed changes by the Examiner.

I. 35 U.S.C. § 102, Anticipation, Claims 1-14 and 18

The Examiner has rejected claims 1-14 and 18 under 35 U.S.C. § 102(e) as being anticipated by *Rohner*, U.S. Patent No. 6,064,392. This rejection is respectfully traversed.

With regard to claim 1, the Examiner states:

> As per claim 1, Rohner discloses an apparatus for optimizing processing of graphics data, the apparatus comprising: a plurality of logic units (fig. 1), wherein the plurality of logic units are used to perform a graphics operation in which a set of constants is required for the graphics operation (column 4 lines 5-11); a first set of connections connecting the plurality of logic units to each other, wherein the first set of connections are used to configure the plurality of logic units to determine the set of constants (fig. 1 and column 2 lines 55-60); a second set of connections connecting the plurality of logic units (column 5 lines 14-20), wherein the second set of connections (to the lookup table) configure the plurality of logic units to perform the graphics operation in which the graphics operation using the constants is determined through the first set of connections (column 5 lines 14-20).

(*Office Action*, dated February 27, 2003, pages 2-3).

A prior art reference anticipates the claimed invention under 35 U.S.C. §102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). The *Rohner* reference cited by the Examiner does not anticipate the present invention as recited in claim 1, because *Rohner* fails to teach each and every element of claim 1. Independent claim 1 reads as follows:

1. An apparatus for optimizing processing of graphics data, the apparatus comprising:

a plurality of logic units, wherein the plurality of logic units are used to perform a graphics operation in which a set of constants is required for the graphics operation;

a first set of connections connecting the plurality of logic units to each other, wherein the first set of connections are used to configure the plurality of logic units to determine the set of constants; and

a second set of connections connecting the plurality of logic units, wherein the second set of connections configure the plurality of logic units to perform the graphics operation in which the graphics operation using the constants is determined through the first set of connections.

Rohner does not teach each and every feature of the presently claimed invention in claim 1. Claim 1 recites having a first set of connections connecting the plurality of logic units to each other, wherein the first set of connections are used to configure the plurality of logic units to determine the set of constants. *Rohner*, as cited by the Examiner, does not teach this feature. The Examiner points to Figure 1 as evidence that *Rohner* teaches this feature:

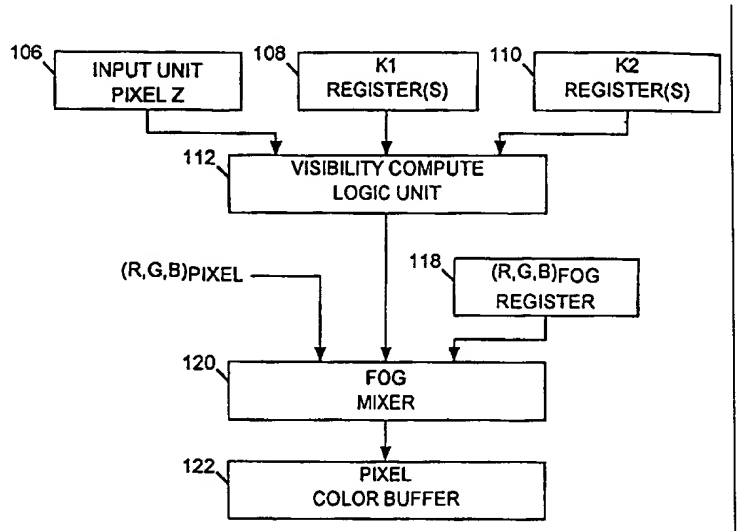

FIG. 1

The figure above shows various components used to simulate the effect of non-homogeneous fog in graphics images. Input unit (106) and registers (108 and 110) are connected to logic unit (112) and provide data for the logic unit to manipulate. Although the Examiner refers to the input unit and registers as being equivalent to a logic unit, input unit (106) and register units (108 and 110) are not logic units themselves – they merely

submit values to the logic unit from which the logic unit can compute the visibility. Registers are special memory cells that hold inputs to the logic unit and provide storage places for the results from the logic unit. An input unit is a device by which data can be entered into the logic unit. Thus, *Rohner* does not teach the step of connecting a plurality of logic units as recited in claim 1.

The Examiner also refers to the following equations in *Rohner* as evidence that *Rohner* teaches using a first set of connections to configure the plurality of logic units to determine the set of constants:

K1 = fog_ratio*fog_distance
K2 = 1-fog_ratio

(*Rohner*, col. 2, lines 55-60). The equations above teach calculating the values for parameters K1 and K2 based on a fog ratio (square root of the ratio of "near fog" density to "far fog" density) and a fog distance (distance from the viewpoint to the point where the visibility is reduced to 37% of full visibility) (*Rohner*, col. 2, lines 9-13). The calculated values are stored in registers 108 and 110 to be provided as inputs to visibility compute logic unit 112. Since *Rohner* has been shown not to teach having a first set of connections connecting the plurality of logic units to each other, *Rohner* cannot teach using the first set of connections to configure the plurality of logic units to determine the set of constants. *Rohner* obtains the parameters of K1 and K2 and stores the values in registers to be provided as inputs to the logic unit. Even if K1 and K2 contain constants, the connection between the registers and the logic unit does not configure the logic units to determine the set of constants. The constants in K1 and K2 are already determined and placed in the registers to be provided to the logic unit. There is no configuration between the registers and logic unit that determines the constants. Thus, *Rohner* fails to teach using a first set of connections to configure the plurality of logic units to determine the set of constants as recited in claim 1.

Furthermore, claim 1 teaches having a second set of connections connecting the plurality of logic units, wherein the second set of connections configure the plurality of logic units to perform the graphics operation in which the graphics operation using the constants is determined through the first set of connections. *Rohner* does not teach this

feature. As argued above, *Rohner* does not teach having a set of connections connecting the plurality of logic units to each other. Thus, *Rohner* cannot teach the feature of having a second set of connections connecting the plurality of logic units.

Furthermore, as stated above, since *Rohner* has been shown not to teach using a first set of connections connecting a plurality of logic units to each other to determine a the set of constants, *Rohner* likewise cannot teach having a second set of connections connecting the plurality of logic units, wherein the second set of connections configure the plurality of logic units to perform the graphics operation in which the graphics operation using the constants is determined through the first set of connections.

Furthermore, the present invention in claim 1 provides one connection set that configures the constants to use in performing a graphics operation and provides a secondary connection set that performs the graphics operation using the constants determined through the first set of connections. *Rohner* also makes no mention of using a second set of connections to perform the graphics operation using the constants determined through the first set of connections. Instead, *Rohner* teaches inputting the values from the input unit and the registers into the visibility compute logic unit. The visibility graphics operation in *Rohner* is performed within the visibility compute logic unit, rather than being performed using additional connections between the input unit, registers, and logic unit.

Therefore, Applicants believe that *Rohner* does not teach all elements of rejected independent claim 1. Accordingly, Applicants respectfully submit that claim 1 is patentable over the *Rohner* reference.

Furthermore, *Rohner* does not teach, suggest, or give any incentive to make the needed changes to reach the presently claimed invention. *Rohner* actually teaches away from the presently claimed invention because it teaches having the registers determine constants as opposed to using a first set of connections to configure the plurality of logic units to determine the set of constants as in the presently claimed invention. Absent the examiner pointing out some teaching or incentive to implement *Rohner* and using a first set of connections to configure the plurality of logic units to determine the set of constants, one of ordinary skill in the art would not be led to modify *Rohner* to reach the present invention when the reference is examined as a whole. Absent some teaching, suggestion, or incentive to modify *Rohner* in this manner, the presently claimed invention

can be reached only through an improper use of hindsight using the Applicants' disclosure as a template to make the necessary changes to reach the claimed invention.

Since claims 2-9 depend from claim 1, the same distinctions between *Rohner* and the claimed invention in claim 1 for these claims. Consequently, it is respectfully urged that the rejection of claims 1-9 have been overcome.

With regard to claim 10, the Examiner states:

> As per claim 10, Rohner discloses a graphics pipeline comprising: an input (fig 1 #106), wherein the input receives graphics data (fig 1 #106); an output (column 4 lines 40-43), wherein the output transmits processed graphics data (column 4 lines 40-43); and a plurality of stages (visibility logic, fog mixer, etc.), wherein a first stage within the plurality of stages is connected to the input (visibility logic) and a last stage within the plurality of stages is connected to the output (fog mixer), wherein a selected stage within the plurality of stages includes a plurality of modes of operation including: a first mode of operation in which the selected stage is configured to determine constants for use in performing a graphics operation (fig. 3 #300 and 302); and a second mode of operation in which the selected stage is configured to perform the graphics operation using the constants (fig 3 #306 and 310).

(*Office Action*, page 13). Rejected independent claim 10 reads as follows:

> 10. A graphics pipeline comprising:
> an input, wherein the input receives graphics data;
> an output, wherein the output transmits processed graphics data; and
> a plurality of stages, wherein a first stage within the plurality of stages is connected to the input and a last stage within the plurality of stages is connected to the output, wherein a selected stage within the plurality of stages includes a plurality of modes of operation including:
> a first mode of operation in which the selected stage is configured to determine constants for use in performing a graphics operation; and
> a second mode of operation in which the selected stage is configured to perform the graphics operation using the constants.

The Examiner points to Figure 1 to show that *Rohner* teaches the graphics pipeline in claim 10. However, as Figure 1 of *Rohner* clearly shows above, the *Rohner* system is not a pipeline at all. Even if we assume, for the sake of argument, that each component as shown in Figure 1 is a logic unit, the structure of the *Rohner* system is not a pipeline. Input unit 106 and registers 108 and 110 are independent components from the logic unit and are not sequentially connected, as should be in a pipeline configuration. Thus, *Rohner* does not teach the graphics pipeline in claim 10.

Furthermore, *Rohner* does not teach each and every element of claim 10. Claim 10 recites a plurality of stages, wherein a first stage within the plurality of stages is connected to the input and a last stage within the plurality of stages is connected to the output, wherein a selected stage within the plurality of stages includes a plurality of modes of operation including a first mode of operation in which the selected stage is configured to determine constants for use in performing a graphics operation and a second mode of operation in which the selected stage is configured to perform the graphics operation using the constants. The Examiner characterizes the visibility logic and fox mixer as each being a "stage" as recited in claim 10 (*Office Action*, page 3). The Examiner then characterizes the visibility logic unit in *Rohner* as being the first stage as recited in claim 10, and the fog mixer as being the last stage (*Office Action*, page 3). The visibility logic unit is designated as the "first stage" since claim 10 recites having the first stage connected to the input. Since claim 10 recites a selected stage having two modes of operation: one configured to determine constants for use in performing a graphics operation, and another configured to perform the graphics operation using the constants, the selected stage both determines constants and performs the graphics operation. Consequently, the visibility compute logic unit in *Rohner* cannot be a "stage" in terms of claim 10. The visibility compute logic unit performs the graphics operation, but does not determine constants, as shown in Figure 2:

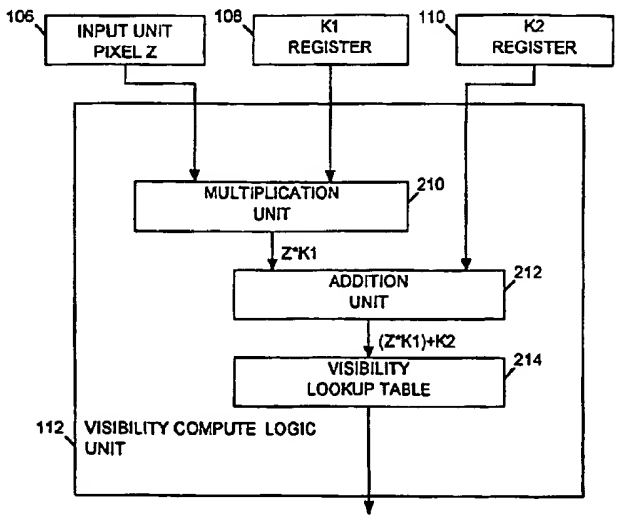

FIG. 2

Registers K1 and K2, defined as "inputs" in the Examiner's characterization, provide the constants to the visibility compute logic unit. Since registers K1 and K2 are inputs to the stage (logic unit), K1 and K2 are not part of the selected stage as defined in claim 10. Thus, *Rohner* fails to teach having a selected stage configured to determine constants for use in performing graphics operation and to perform the graphics operation using the constants.

Therefore, Applicants believe that *Rohner* does not teach all elements of rejected independent claim 10. Accordingly, Applicants respectfully submit that claim 10 is patentable over the *Rohner* reference.

Since claims 11-18 depend from claim 11, the same distinctions between *Rohner* and the claimed invention in claim 11 for these claims. Additionally, claims 15-17 claim other additional combinations of features not suggested by the reference. For example, claim 15 recites having a raster engine connected to the output, a feature that is missing in the *Rohner* reference. Consequently, it is respectfully urged that the rejection of claims 11-14 and 18 have been overcome.

In sum, Applicants believe that the rejection of claims 1-14 and 18 under 35 U.S.C. § 102(e) has been overcome. Applicants respectfully request that claims 1-14 and 18 be allowed.

II. 35 U.S.C. § 103, Obviousness, Claims 22-23

The Examiner has rejected claims 22 and 23 under 35 U.S.C. § 103(a) as being unpatentable over *Rohner* in view of *Bowen et al*, U.S. Patent No. 5,404,448. This rejection is respectfully traversed.

As per claims 22 and 23, the Examiner states:

> As per claim 22, Rohner discloses an input configured to receive graphics data (fig 1 #106); a geometry engine wherein the geometry engine receives graphics data, processes the graphics data to form the processed graphics data, wherein the geometry engine includes a set of processing elements in which at least one processing element within the set of logic units, in which the set of logic units is used to perform an operation on the graphics data using an equation and wherein a portion of the set of logic units is used to determine at least one constant for the equation used in the operation (column 4 lines 1-20). However, Rohner

does not specifically mention frame buffers with raster engine. This is disclosed in Bowen et al in column 8 lines 54-68 and column 9 lines 1-20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use frame buffer with the system of Rohner because Rohner does describe updated frames (column 4 lines 29-35) therefore a frame buffer would have been required to store the frames.

(*Office Action*, page 5-6). Independent claim 22 reads as follows:

> 22. A graphics adapter comprising:
> an input configured to receive graphics data;
> a frame buffer, wherein processed graphics data is stored for display;
> a raster engine connected to the input and to the frame buffer, wherein the raster engine rasterizes the processed graphics data for display,
> a geometry engine connected to the raster engine, wherein the geometry engine receives graphics data from the raster engine, processes the graphics data to form the processed graphics data, and returns the processed graphics data to the raster engine and wherein the geometry engine includes a set of processing elements in which at least one processing element within the set of processing elements includes a set of logic units, in which the set of logic units is used to perform an operation on the graphics data using an equation and wherein a portion of the set of logic units is used to determine at least one constant for the equation used in the operation.

Claim 22 is patentable over the cited references because the combination of *Rohner* with *Bowen* would not reach the presently claimed invention. The features relied upon as being taught in *Rohner*, such as using a portion of the set of logic units to determine at least one constant for the equation used in the operation, are not taught or suggested by that reference, as explained above. As a result, a combination of these references would not reach the claimed invention in claim 22.

Bowen does not cure the deficiencies of *Rohner*. Although *Bowen* teaches using frame buffers and a raster engine, *Bowen* is directed toward a memory system that allows faster access of graphics information. *Bowen* organizes a random access memory system so that multiple pixels may be accessed when on row column address is provided. However, *Bowen* is not concerned with reducing the complexity and size of graphics functions in processing elements. *Bowen* makes no mention of simplifying equations by

identifying variables in the equations that remain constant over a set of repeated operations. As a result, *Bowen* fails to provide for the deficiencies of *Rohner*.

Since claim 23 depends from claim 22, the same distinctions between *Rohner* and the claimed invention in claim 22 for these claims. Consequently, it is respectfully urged that the rejection of claims 22 and 23 have been overcome.

Therefore, Applicants believe that the rejection of claims 22-23 under 35 U.S.C. § 103 has been overcome. Applicants respectfully request that claims 22-23 be allowed.

III. 35 U.S.C. § 103, Obviousness, Claims 15-17

The Examiner has rejected claims 15-17 under 35 U.S.C. § 103(a) as being unpatentable over *Rohner* in view of *Fischer et al*, U.S. Patent No. 5,392,392. This rejection is respectfully traversed.

Claims 15-17 are patentable over the cited references because the combination of *Rohner* with *Fischer* would not reach the presently claimed invention. The features relied upon as being taught in *Rohner* are not taught or suggested by that reference, as explained above in the response to the rejection of claim 10. As a result, a combination of these references would not reach the claimed invention in claims 15-17.

Therefore, Applicants believe that the rejection of claims 15-17 under 35 U.S.C. § 103 has been overcome. Applicants respectfully request that claims 15-17 be allowed.

IV. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

DATE: 5/27/3

Respectfully submitted,

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